

WHAT IS CLAIMED IS:

1. A nanocrystalline material, comprising:
a metal; and
5 an element selected from the group consisting of oxygen, nitrogen, carbon, boron, sulfur, phosphorus, silicon, a halogen, hydrogen and combinations thereof, wherein the nanocrystalline material contains at least about one atomic percent of the element.
- 10 2. The nanocrystalline material of claim 1, wherein the nanocrystalline material comprises at most about 90 weight percent of the element.
3. The nanocrystalline material of claim 1, wherein the nanocrystalline material is in the form of a free-standing powder.
- 15 4. The nanocrystalline material of claim 1, wherein the nanocrystalline material is contained within a composition that further comprises a pharmaceutically acceptable carrier.
- 20 5. The nanocrystalline material of claim 1, wherein the nanocrystalline material is contained within a solution that further comprises a solvent.
6. The nanocrystalline material of claim 1, wherein the nanocrystalline material is in the form of an aerosol.
- 25 7. The nanocrystalline material of claim 1, wherein the nanocrystalline material is contained in a composition that further includes a hydrocolloid.
8. The nanocrystalline material of claim 1, wherein the nanocrystalline
30 material is contained in an article in the form of a tape, a pill, a capsule, a tablet, a lozenge or a suppository.

9. The nanocrystalline material of claim 1, wherein the nanocrystalline material is in the form of an article including a substrate and a coating, and the nanocrystalline material is in the coating.

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10. The nanocrystalline material of claim 1, wherein the nanocrystalline material is in the form of an agglomerate of clusters of atoms.

11. The nanocrystalline material of claim 1, wherein the nanocrystalline material comprises an atomically disordered, crystalline material.

12. The nanocrystalline material of claim 1, wherein the nanocrystalline material comprises a material selected from the group consisting of antimicrobial materials, antibacterial materials, anti-inflammatory materials, antifungal materials, antiviral materials, anti-autoimmune materials, anti-cancer materials, pro-apoptosis materials, MMP modulating materials, anti-proliferative materials, and combinations thereof.

13. The nanocrystalline material of claim 1, wherein the metal comprises silver.

14. The nanocrystalline material of claim 1, wherein the nanocrystalline material comprises at least two different metal elements.

15. An atomically disordered, crystalline material, comprising:
a metal; and
an element selected from the group consisting of oxygen, nitrogen, carbon, boron, sulfur, a halogen, phosphorus, silicon, hydrogen and combinations thereof,
wherein the atomically disordered, crystalline material contains at least about one atomic percent of the element.

16. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material comprises at most about 90 weight percent of the element.

5 17. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is in the form of a free-standing powder.

18. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is contained within a composition that further
10 comprises a pharmaceutically acceptable carrier.

19. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is contained within a solution that further
15 comprises a solvent.

20. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is in the form of an aerosol.

21. The atomically disordered, crystalline material of claim 15, wherein the
20 atomically disordered, crystalline material is contained in a composition that further includes a hydrocolloid.

22. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is contained in an article in the form of a tape,
25 a pill, a capsule, a tablet, a lozenge or a suppository.

23. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is in the form of an article including a substrate and a coating, and the atomically disordered, crystalline material is in the
30 coating.

24. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material is in the form of an agglomerate of clusters of atoms.

5 25. The atomically disordered, crystalline material of claim 15, wherein the atomically disordered, crystalline material comprises a material selected from the group consisting of antimicrobial materials, antibacterial materials, anti-inflammatory materials, antifungal materials, antiviral materials, anti-autoimmune materials, anti-cancer materials, pro-apoptosis materials, MMP modulating materials, anti-proliferative, and
10 combinations thereof.

26. The atomically disordered, crystalline material of claim 15, wherein the metal comprises silver.

15 27. The atomically disordered, crystalline material of claim 15, wherein the nanocrystalline material comprises at least two different metal elements.